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ABSTRACT

This report presents the objectives, methodology, and results of a study which assessed the selection and utilization of four MEDLINE search systems by faculty and medical residents at the George Washington University Medical Center. The four systems, which were provided or sponsored by the Himmelfarb Health Sciences Library, offer a wide range of information access and different levels of user interface: (1) miniMEDLINE, a locally mounted subset of the MEDLINE database which uses a very simple menu driven interface and is available from terminals at the library or via dial-access on the university's local area network or by modem; (2) SilverPlatter CD-ROM with MEDLINE database disks; (3) BRS/Colleague, a commercial search service with a "user friendly" interface that offers the entire MEDLINE file, additional related databases, and more than 15 journals and 25 textbooks in full text; and (4) Paperchase, a "poineer" user friendly computer program which allows physicians to simply and directly perform searches of MEDLINE. System preferences and characteristics are cross-tabulated with user characteristics to: (1) evaluate resident and faculty preferences; (2) determine if specialized search characteristics on the four systems affect system selection and differ by user group; (3) determine if search patterns differ by medial specialty group; and (4) determine the impact of library support on system utilization. Tables and graphs highlight the findings of the study. The survey instrument and 12 references are included. (MAB)

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A Study on the Selection and Utilization of MEDLINE Search Systems

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A Study on the Selection and Utilization of MEDLINE Search Systems

ABSTRACT

This study proposes the collection of data assessing the selection and utilization of four **MEDLINE** search systems by faculty and medical residents. System characteristics will be cross-tabulated with user characteristics. The investigators will analyze the data to determine if selection and utilization patterns can be attributed to specific user characteristics.

LITERATURE REVIEW

A 1981 article by Horowtiz and Bleich in the New England Journal of Medicine described the development of **Paperchase**, a computer program which allowed physicians to simply and directly perform searches of the biomedical literature in the **MEDLINE** database produced by the National library of Medicine (**NLM**). This program heralded what was to become a new decade of user-friendly search systems. The NLM began to offer physicians and researchers the option of condensed training for the "original" **MEDLINE** system. Companies like BRS, Dialog, the American Medical Association, and Mead Data Central all become vendors for versions of the **MEDLINE** search system supplemented by a variety of other bibliographic and textual databases. (Feinglos, 1983; Lipow, 1984) **Paperchase**, the pioneer system, also became commercially available (Horowitz et al, 1983). Libraries, in an effort to control costs while promoting the use of information systems, leased **MEDLINE** tapes from **NLM** and purchased or developed search software to be used on their local computer system (Broering, 1985). Self-service **MEDLINE** access increased with the introduction of front-end software search systems (Schoolman, 1986; Haynes and McKibbon, 1987; Schell and Rathe, 1988) and CD-ROM technology (Wertz, 1986; NLM symposium on MEDLINE on CD-ROM, 1988; Capadogli et al, 1988).

The literature in this eight year time period informed users about what was required for PC's to communicate with remote databases (Bader et al, 1985), surveyed users to determined the purpose for searches (Fazzone and DeSimone, 1984), made recommendations on how to choose the online medical database that best suited individual needs (Feinglos, 1983; Marshall, 1986; Hayes et al, 1986), compared systems based on cost (Hayes et al, 1985), evaluated user attitudes towards end-user literature searching (Poisson, 1986; Ludwig et al, 1988), compared various **MEDLINE** search systems (Haynes et al, 1986, Simon, 1988; Bonham and Nelson, 1988, Porter et al, 1988), described teaching skills in information retrieval (Kolner et al 1986; Bader and Martin,

1988), and explored the use of information systems by health professional (Osiobe, 1985; Rutledge, 1986; Piemme, 1988).

Regardless of the apparent amount of research interest, results of these reports have not been integrated. There have been no reported attempts to determine if user preferences for particular systems correspond with specific sets of user characteristics. Research would also reveal if there are preferential factors (e.g. local training, influence of peers) which negate other system features (e.g. availability of full text articles, searching capabilities, cost) creating user preference for a particular system. Such information would be valuable for educational and instructional programs which promote the use of online information systems. This research will reveal if there are indicators which could be used by librarians to tailor the selection of a search system best suited to the user's needs.

Search Systems Supported by the Himmelfarb Library

The Himmelfarb Library, in addition to its traditional mediated search service, actively supports four user-friendly search system options. It sponsors umbrella accounts for both BRS/Colleague and Paperchase. Discounts based on volume use are passed back to subscribers. The library also offers two free search services, miniMEDLINE* and the Silver Platter CD-ROM MEDLINE system. The library periodically holds seminars on selecting the search system which best meets user needs and has developed a self-assessment tool to help individuals in this process (Appendix 1). Seminars are not limited to the systems "supported" by the library (e.g. information on Grateful MED and Dialog is provided). For the systems supported by the library, hands on training at basic and more advanced levels is offered.

The systems supported by the library offer a wide range of information access and different levels of user interface:

miniMEDLINE - developed by the Georgetown University, is a locally mounted subset of the MEDLINE database. Based on a profile customized for The George Washington University Medical Center (GWUMC), the database contains five years of citations and abstracts from 456 titles. The system uses a very simple menu driven interface and is available from terminals at the Library or via dial-access on the University's LAN or by modem.

Silver Platter CD-ROM - with discs representing the MEDLINE database back to 1983 is made available from one workstation in the library. The user interface is a fairly complex command driven system.

*The miniMEDLINE SYSTEM is a trademark of Georgetown University.

BRS/Colleague - is a commercial search service whose features include in addition to the entire MEDLINE file, a number of medically relevant and other databases, plus over 15 journals and 25 textbooks in full text. While considered "user friendly", searchers must learn the system's commands.

Paperchase - is another commercial search service, which is limited to the MEDLINE file only. It automatically points users from text words to medical subject headings and its interface is a simple menu-driven system.

Objectives

A survey to assess the selection and utilization of MEDLINE search systems by full-time faculty and residents was conducted at the George Washington University Medical Center in the Fall of 1989. The purpose of this study was 1) to determine resident and faculty preferences among four user friendly search systems provided or sponsored by the Himmelfarb Health Sciences Library and 2) to determine if the selection and utilization patterns amongst these systems can be attributed to specific user characteristics. System preferences and characteristics were cross-tabulated with user characteristics to:

- evaluate resident and faculty preferences among four competitive user friendly search systems: **miniMEDLINE, BRS/Colleague, Paperchase, and Silver Platter CD-ROM MEDLINE;**
- determine if specialized search characteristics on the various systems effect system selection and are different by user group;
- determine if search patterns differ by medical specialty group.
- correlate system selection with user demographics and search requirements; and
- determine the impact of library support (i.e. availability, training access, and financial subsidy) on system utilization.

Methodology

In September 1989 a four page, 20 item, questionnaire was developed. The Questionnaire is attached as Appendix 2. The questionnaire was tested for clarity and reliability on the first 30 users enrolled in the study and no problems were detected. Some confusion among users regarding search system "terminology"

surfaced during the full study and will be discussed later in this report.

In November and December of 1989, a total of 766 surveys were sent to all residents and full time faculty. A total of 320 completed questionnaires (138 and 182 from residents and faculty, respectively) were received. The overall response rate was 42%. The stated goal of a 30% response rate from users in each Medical Center department was achieved. Although faculty represent less than half (47%) of the entire population studied, they comprise over half (57%) of the respondents. Conversely, residents, which represent over half of the population (53%) comprise less than half of the respondents at 43%. Since only a third of all residents responded while half of the faculty responded, conclusions drawn from this study need to consider that the faculty are somewhat over represented and residents under represented in the response data.

Table 1 displays the response rate by user group:

TABLE 1

RESPONSE RATE

Questionnaires	Responses	Percent Group Response
R 405 (53%)	138 (43%)	34%
F 361 (47%)	182 (57%)	50%
Total 766 (100%)	320 (100%)	42% (Of total)

R = Residents F = Faculty

In September 1990, surveys were sent to 147 new residents of the George Washington University Medical Center to validate conclusions reached from the first survey. Fifty-four of these surveys were completed, with a response rate of 37%. The main portion of results reported below present the findings from the original group of 320 completed surveys. The results of the second survey, which virtually replicate the results of the initial survey and validate conclusions drawn from the original data, follow the reporting of the initial study findings.

The data from these questionnaires were tabulated using SPSS (Statistical Package for the Social Sciences).

RESULTS

Respondent Characteristics

Of the 320 respondents in the first survey, somewhat over half (56.9%) were medical center faculty and the remainder were residents (43.1%). These individuals represented 30 departments and divisions within the GWUMC. Nine departments, each with more than 5% of total respondents, account for 67% of all responses (Table 2). All other departments comprised less than five percent each of the total. The second survey of new residents revealed strikingly similar results with 8 departments accounting for more than 5% each of respondents and 66.9% of all respondents. As can be seen from the Table, six departments (Internal Medicine, Medicine, Pathology, Obstetrics & Gynecology, Anesthesiology, and Surgery remain consistent in having a greater number of users than other departments. When member status (residents v. faculty) is cross-tabulated with department, no statistically significant relationship emerges.

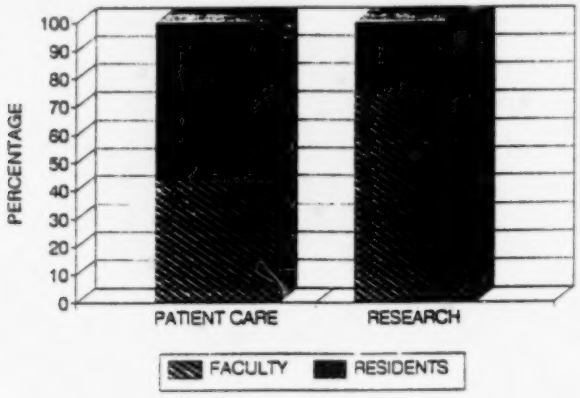
Table 2 Departments with 5% or more of total respondents

Initial Survey		Second Survey	
Internal Medicine	10.9%	Internal Medicine	13.0%
Medicine	10.0%	Surgery	11.1%
Health Care Sciences	8.4%	Anesthesiology	9.3%
Pathology	8.1%	Medicine	9.3%
Obstetrics/Gynecology	6.9%	Obstetrics/Gyn	7.4%
Anesthesiology	5.9%	Emergency Medicine	5.6%
Radiology	5.9%	Pathology	5.6%
Emergency Medicine	5.6%	Urology	5.6%
Surgery	5.3%		

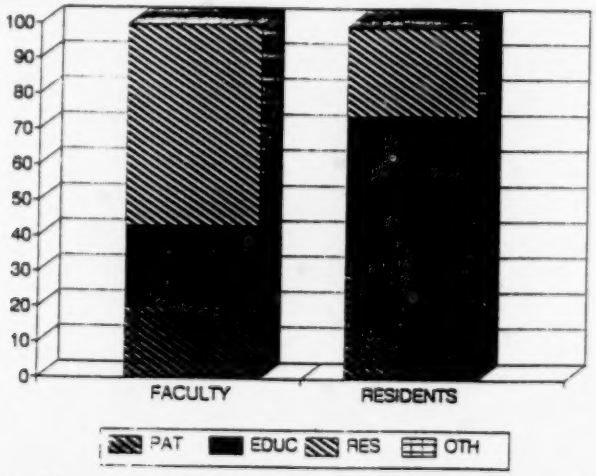
Primary Use of Searches

About two thirds of all respondents indicated that their primary reason for MEDLINE searching was either research (43.1%) or education (30.9%). One quarter stated that patient care was their main area for MEDLINE use (25.0%). The remainder chose the category "other" (0.6%) or did not respond (0.3%). In an analysis of the search systems used most often in the last six months, there appears to be no statistical correlation between the system used most and primary use (patient care, education, research) of the MEDLINE search.

There does, however, appear to be a statistically significant relationship between whether an individual is a resident or faculty member and their primary use of MEDLINE searches (p=.001). While faculty comprise three-quarters (74.6%) of all those reporting research as the primary use for searches, the residents represent the majority (56.3%) of those who use searching for patient care reasons.



When the use of searches by faculty and residents as individual groups was examined, approximately one third of residents report searching for patient care reasons, while only about one fifth of faculty report the same purpose. Over two fifths of residents (41.3%) report searching for educational purposes, while just over one fifth of faculty (23.2%) report the same. The majority of faculty responding report using searches for research purposes (56.9%).



This finding held firm in the second survey conducted. Residents reported primary use of searches for Patient Care 40.7%, Education 35.2%, and Research 22.2%.

Since faculty and residents use MEDLINE for different purposes, the implications for the library are that it will need to continue its support of different systems to meet the distinct needs of these constituencies. This would confirm the need for a full MEDLINE system being provided (e.g. the Silver Platter CD-ROM) when a subset more focused on clinical applications (e.g. miniMEDLINE) is provided. Faculty do searches for research purposes three times more frequently than do house staff. House staff, on the other hand, use computer searches for patient care reasons about 1.7 times more frequently than do faculty.

Users' Years of Graduation and Levels of Experience

It cannot be said that only younger users are inclined to perform their own database searching, since the range of year of graduation from medical school was from 1945 through 1989. The mode was 1985, with 29 individuals. Fifty percent graduated in 1982 or later. Over 90% of residents graduated in 1986 or later. In the second survey 83.2% of the residents graduated in 1986 or later. Of the faculty, 44% graduated before 1975, while 51.1% graduated from 1976 through 1985. When year graduated is cross-tabulated with department, no statistically significant relationship is found.

There was almost a 50-50 split when respondents self-described their level of experience with online searching. Those who were somewhat or very experienced comprised 46.9 percent of the group, while those who declared they were either not very or not at all experienced made up 52.9 percent. The results of the second survey were basically the same with 48.1% indicating they were somewhat or very experienced in searching.

There is no statistically significant relationship found when year of graduation is cross-tabulated with computer experience ($p=.06$). When computer experience is cross-tabulated with member status (faculty v. resident) no significant relationship can be found either ($p=.32$).

Again, no assumptions should be made by librarians regarding the willingness of patrons to do computer searches, i.e. older or less computer literate individuals are no less likely to do searches than younger, more computer experienced individuals.

When level of experience was cross-tabulated with the system most used in the last 6 months, the relationship was found to be statistically significant with a p value of .001. MiniMEDLINE is the most used system, no matter what level of experience the user possesses. There is an increased likelihood that individuals who categorized themselves as less experienced will choose miniMEDLINE over other systems. Over 94% of those with no

experience at all chose this system, while 79%, 74% and 59% of the other groups (not very, somewhat, and very experienced) chose miniMEDLINE. In the categories of very experienced and somewhat experienced, BRS/Colleague was the next most popular system used (14% and 12%, respectively). For the not very experienced, Silver Platter was the next most popular system (14%). Of those who were not at all experienced, only one other system, Silver Platter, was used, with only 5.3% of that group indicating this choice. It may be hypothesized that inexperienced users are less hesitant to try low- or no- cost search systems. This data supports the selection of easy-to-use systems when the user population has limited experience with search systems.

TABLE 3 SEARCH SYSTEMS USED IN LAST 6 MONTHS v. MOST USED

A. Initial Survey

ALL SEARCH SYSTEMS USED IN LAST 6 MONTHS*		SYSTEM USED MOST
miniMEDLINE	91.6%	77.0%
PAPERCHASE	3.7%	2.5%
BRS/COLLEAGUE	17.2%	7.2%
SILVER PLATTER CD-ROM	27.8%	10.4%
OTHER	11.8%	2.8%

B. Follow-Up Survey

ALL SEARCH SYSTEMS USED IN LAST 6 MONTHS*		SYSTEM USED MOST
miniMEDLINE	92.6%	77.8%
PAPERCHASE	1.9%	5.6%
BRS/COLLEAGUE	7.4%	5.6%
SILVER PLATTER CD-ROM	18.5%	9.3%
OTHER	1.9%	1.9%

*Question permitted more than one response

MiniMEDLINE is resoundingly the system used most often, with over 91% of all respondents in both surveys indicating they have used it in the last 6 months. Over three quarters (77%) of the survey groups then reported miniMEDLINE as being the search system most used in the last six months. This means that 84% of the individuals who tried miniMEDLINE maintain it as the search system they use most often. Considering Silver Platter CD-ROM is the primary search system selected by the next largest group of users, over 87% report using one of the systems provided free of cost by the library.

When the search system used most often is cross-tabulated

with department, a statistically significant relationship is found with p=.002. Of the five choices for the search system most often used in the last six months, miniMEDLINE clearly was the most used system by far. Two-thirds or more of respondents in twenty-two of the 30 departments reported using miniMEDLINE the most. There are five departments which are an exception to this pattern: the Departments of Anesthesia, Pharmacology, Psychology, Pathology, and Ophthalmology. Each of these departments has one third of its members using either one or two other systems, but no commonality regarding choice of a second search system can be found. We hypothesize that these departments have a greater need for basic science or other research not available through miniMEDLINE. Anesthesiology, for example, has recently purchased its own SILVER Platter CD-ROM workstation. Several departments which do not fit the pattern of 75% primary use of miniMEDLINE are too small and have too few respondents to draw any conclusions.

The use of systems other than miniMEDLINE cannot be attributed to a pattern of use by faculty vs. resident status. When the system used the most in the last six months is cross-tabulated with whether the user is a resident or faculty member, a significant relationship is found with p=.02. It appears that most residents and faculty use miniMEDLINE (84% and 72%, respectively). All other systems are used by approximately 10 percent or less of each group. Again, due to the overwhelming choice of miniMEDLINE as the primary search system by all respondents, no statistically significant relationship could be determined for the selection of a system other than miniMEDLINE by departmental affiliation.

There were nine individuals who indicated they selected a search system other than one of the four supported by the library as the system they use most often. Six of the nine selected Grateful Med, with one user each selecting Dialog, Aries Knowledge Finder, and MEDLINE (direct from NLM). While eight of these users are faculty and only one a resident, they represent eight different departments. Only four of the eight had even tried miniMEDLINE, two had tried Paperchase and one the Silver Platter CD.

EFFECT OF COST ON SEARCH SYSTEMS

Slightly over half of the respondents stated that cost was not a significant factor in choosing the system most used over the last six months (52.8%). 30.0% felt that cost had some significance while only 17.2% thought it was very significant. When cost is cross-tabulated by member group, a statistically significant relationship is found with p=.015. While a majority of residents (61%) feel cost is not significant, only 46% of faculty believe cost is not significant. In the survey of new residents, 55.6% initially report cost is not significant in the

choice of a search system. However, when asked who pays the cost of the system selected, 85.2% select a system paid for by the library or their department. This is corroborated by the fact that 87% use a search system provided free by the library or paid for by their department. Only 2.2% and 1.9% in each survey respectively report paying for their own searches.

When significance of cost is cross-tabulated with who pays for these services, a statistically significant relationship is shown (p=.001). Of those who state that cost is very significant 74.1% use the free searching available in the library while another 16.7% of those who believe cost is very significant have their search costs paid by their department. Only 9.3% of those who say cost is very significant pay for searches themselves.

The response to the question regarding cost as a significant factor in the selection of a search system is confusing. The findings in our survey tend to belie the general response by a little more than half of the respondents that cost is not a significant factor in choosing the search system used most often. Despite user's initial reaction to questions regarding costs, either the free "choices" offered by the library are indeed superior search systems which meet all their needs and preferences or users' perceptions of the influence of cost are different than their actions in final system selection.

Reasons for the Selection of the Search System Used Most Often

Users were asked to circle all statements from the group below which describe their reasons for using the search system they use most often:

	Initial	Follow-up
Only want citations within the GWUMC Library	43.8	63.0
Want to search entire MEDLINE file	40.9	27.8
Want to order online articles myself	20.9	18.5
Like online access to full text	20.9	13.0
Sometimes want to search other databases	5.6	0.0
System I use has more advanced capabilities	6.6	3.7

The desire to retrieve only citations to journals owned by the Himmelfarb Library makes sense considering the overwhelming popularity of miniMEDLINE.

The responses to this question point to the problems of library jargon. The choice "I usually want to search the entire MEDLINE file" serves to show that despite written explanation regarding system limitations, users may not be well informed concerning the limits of the miniMEDLINE database. Since miniMEDLINE is a subset of the entire MEDLINE file, and 77% of the respondents use miniMEDLINE as their primary search system, the 40.9% response rate indicating that respondents use this

system to search the entire MEDLINE file is contradictory. This demonstrates a definite gap in understanding the database which is being searched, an essential issue which needs to be addressed by librarians providing access and instruction on the system. The reduction in the number of respondents in the second survey indicating a desire to search the entire MEDLINE file can be attributed to an increased effort, based on the results of the first survey, to emphasize the limitations of the miniMEDLINE file.

Again, the response to "to order articles online" is another reflection of this comprehension gap. Rather than referring to the capability for placing an order for online document delivery, users, we discovered, are indicating their satisfaction with miniMEDLINE's capability to individually select citations to be printed. Likewise, the positive response regarding the capability of having "online access to full text" of journals from miniMEDLINE users reflects their satisfaction with having abstracts available with the bibliographic citation.

A series of 8 statement choices, where respondents could choose any two, was given to help characterize reasons regarding why a specific system was used most often. The choices fell into 3 broad categories which relate to user friendliness or training requirements of the system, system costs, and prior recommendation/introduction to the system. When the responses are rank ordered (Table 4), the following pattern emerges: emphasis placed on ease of use and cost, with other choices ranking lower and having many fewer responses.

TABLE 4

A. Initial Survey

60.0%	I use a system that is easy to use and requires no training.
44.4%	I use a system available for free from the Library.
28.1%	I use a system which meets my needs better than other.
19.1%	I use the system paid for by my department.
13.4%	I used the system before coming to GWUMC.
8.4%	I use a system for which the Library offers training.
7.8%	I use a system which was recommended by a colleague.
0.9%	I use a system which I saw demonstrated at a professional meeting.

B. Follow-up Survey

64.8%	I use a system that is easy to use and requires no training.
44.4%	I use a system available for free from the Library.
35.2%	I used the system before coming to GWUMC.
14.8%	I use a system which meets my needs better than other.
5.6%	I use the system paid for by my department.
5.6%	I use a system for which the Library offers training.
1.9%	I use a system which was recommended by a colleague.
0.0%	I use a system which I saw demonstrated at a professional meeting.

The lack of freedom of choice because of cost constraints is evident again as 44% of each survey group respond they have selected a search system because it is provided free by the library. While this is not a majority of users, it should be noted as a sizeable constituency amongst the user group and the consequences of not having a free search alternative available considered. If the library did not provide a free search alternative, there is a strong possibility these users would not avail themselves of any search service at all. The library found this to be the case with medical students, who prior to the initiation of the miniMEDLINE service, represented at most 2% of our search service. With the availability of a free search alternative, students now represent over 35% of miniMEDLINE utilization.

Only 28% and 14.8% of all respondents respectively feel they have selected a system specific to their own needs. In comparison, 88% of respondents who most often use a system other than the ones paid for by the library feel they have selected the system because it best meets their needs.

The importance of a system which is not only free, but is easy to use is supported by the high level of response to that characteristic. What is interesting to note in the second survey is the increase in the response to the question on use of the search system prior to coming to GWUMC.

Satisfaction with Searches and Retrieval Expectations

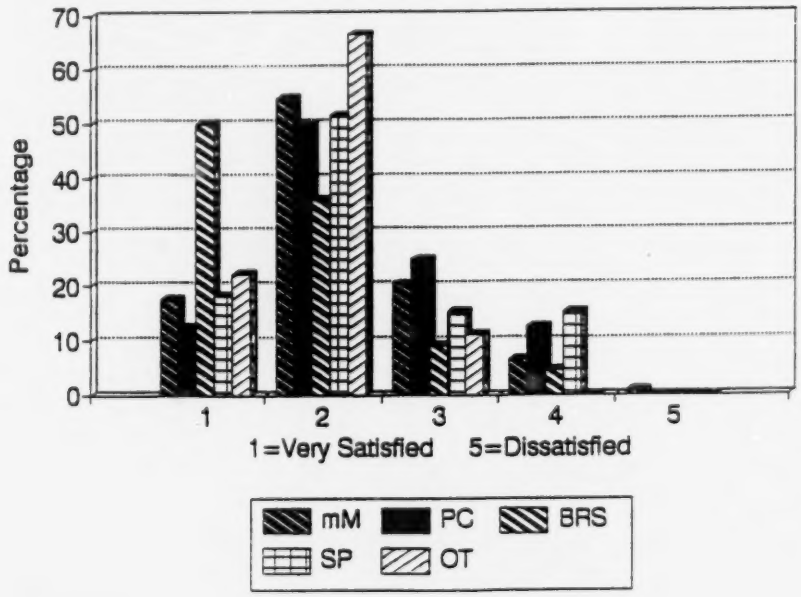
The overwhelming majority of individuals are satisfied with the results of their searches. The very or somewhat satisfied categories account for 73.2% of the respondents. Almost one fifth report being neutral about their searches (18.9%) while less than one percent (0.6%) report being dissatisfied.

While there is no statistical correlation found when satisfaction with searches is cross-tabulated with system most often used, the comparison among systems is interesting. There

is no dissatisfaction amongst users who have selected another system and BRS certainly enjoys both the least dissatisfaction and the greatest percentage of very satisfied users. It should be noted that miniMEDLINE, the most heavily used system, has a dissatisfaction level lower than Paperchase and only slightly higher than BRS. Thus, while users who select a system that they feel meets their own needs may report higher rates of satisfaction, statistically, the level of satisfaction may be considered comparable between systems for which users or their departments pay and those provided by the library.

Table 5 Satisfaction Level

Search Satisfaction	Total	mini MEDLINE	Paper Chase	BRS	Silver Platter	Other
# Respondents	317	245	8	22	33	9
Very satisfied	19.9%	17.6%	12.5%	50.0%	18.2%	22.2%
Somewhat satisfied	53.3%	54.7%	50.0%	36.4%	51.5%	66.6%
Neutral	18.9%	20.4%	25.0%	9.1%	15.2%	11.1%
Somewhat dissatisfied	7.3%	6.5%	12.5%	4.5%	15.2%	
Dissatisfied	.6%	.8%				



Over two thirds report that they receive the right number of citations in their searches (68.4%). About one fifth state that there are too few citations (19.4%) while just over one tenth state there are too many (10.9%).

There is a statistically significant (p=.001) relationship when level of satisfaction with searches and the users' expectations regarding the number of citations retrieved are cross-tabulated. Of those who indicated that they receive the right number of citations, 83.1% are either somewhat satisfied or very satisfied with their searches.

When number of citations retrieved is cross-tabulated with the system used most often, a vast majority of users indicate that they receive the right number of citations no matter which system they use. This would seem to indicate that users have self-selected a system which meets their retrieval requirements, at least in terms of the number of citations expected.

Table 6

Retrieval Satisfaction	Total	mini MEDLINE	Paper Chase	BRS	Silver Platter	Other
# Respondents	314	242	8	22	33	9
Too few citations	19.7%	22.3%		4.5%	21.2%	
Right number citations	69.4%	69.4%	87.5%	68.2%	60.6%	88.9%
Too many citations	10.8%	8.3%	12.5%	27.3%	18.2%	11.1%

FIRST THING DONE WHEN NOT SATISFIED WITH SEARCH RESULTS

Most individuals involve the library staff when not satisfied with the results of their self-done searches. The most common response was to ask a librarian for assistance (45.3%), followed by requesting a librarian to perform a search (21.3%). Less than five percent ask a colleague for assistance (4.1%). About an equal percentage of individuals do nothing further (10.3%) or use another system (11.9%).

Where, When, and How Frequently Users Search

Questions regarding where people search, the reasons for the choice of their primary search site, the time of day and how often they search were asked to determine the impact of these factors on the selection of a primary search system.

Respondents were first asked to indicate all locations where searches were performed and then to identify their primary search site (Table 7). On face value, it seems inevitable that the library is the primary site for searching since miniMEDLINE is the search system predominantly used. A statistically significant value of p=.00001 is found when prime location for

searching is cross-tabulated with system used most often. Again the results are driven by the popularity of the miniMEDLINE system among users as 78% of its use occurs in the library and it is the major system used by those searching from their Office/Department (56.5%) and Home (60.7%) as well.

Table 7

LOCATION OF SEARCHES		PRIMARY SEARCH SITE	
Library	85.6%	Library	70.6%
Office/Department	30.0%	Office/Department	19.7%
Home	19.7%	Home	8.8%

The fact that there are numerous personal computers throughout the Medical Center and pc's are becoming more common in the home would lead the library to believe a higher percentage of its users would no longer consider the library as the primary site for doing searches. Respondents who indicated that most searching was done from the library were asked to indicate why. While there may be a growing number of personal computers in departments and owned personally, almost half of those responding to this question said computer equipment was not available to them.

Table 8 Reason Most Searching Is Done In Library

Prefer to work in the library	19.7%
Computer equipment not available at office/home	48.5%
Librarians are available to assist	26.6%
CD equipment only available in the library	5.2%

It should be noted that over one quarter of those searching in the library do so to avail themselves of librarian assistance. Contrary to the belief of those who think libraries will become holding facilities (warehouses) where users never go, almost one fifth of the respondents indicate a preference for working in the library. The questionnaire did not pursue this issue further so no conclusions can be made about whether users' preference for using a search system in the library may be 1) because that's where the journals are (journals are not yet readily available in machine readable form) or 2) because the library is a good place to escape from unwanted interruptions.

Users were asked to approximate the number of searches conducted in the last month. The overall total for frequency of searching is:

Number of searches in the last month	
0 - 3 times	64.7%
4 - 6 times	21.6%
7 - 10 times	7.2%
> 10 times	6.3%

The analysis of the number of searches done in the last month by primary search system reveals significant findings (p=.0000).

Table 9 A. System Use by Number of Searches per Month

Searches/ Last Month	mini MEDLINE	Paper Chase	BRS	Silver Platter	Other
0 - 3 times	69.7%	37.5%	39.1%	60.6%	33.3%
4 - 6 times	19.7%	12.5%	39.1%	33.3%	
7 - 10 times	5.7%	37.5%	13.0%	3.0%	22.2%
> 10 times	4.9%	12.5%	8.7%	3.0%	44.4%

B. Number of Searches per Month by System

	0 -3	4 - 6	7- 10	>10
miniMEDLINE	82.9%	69.6%	60.9%	60.0%
Paperchase	1.5%	1.4%	13.0%	5.0%
BRS	4.4%	13.0%	13.0%	10.0%
Silver Platter	9.8%	15.9%	4.3%	5.0%
Other	1.5%		8.7%	20.0%

In the direct question regarding the influence on the number of searches on the selection of a primary search system, only 39.7% report that the number of searches they perform affects the decision, while 57.2% stated that this was not significant. However, if searchers use a system other than miniMEDLINE there is an increased likelihood they will search with greater frequency. Alternatively, although miniMEDLINE is the largest component of each "number of searches in the last month" category, the magnitude decreased as the number of searches per month increased. Possible explanations include greater

sophistication on the part of heavy users who not only know the limitations of miniMEDLINE searching, but also who can function with less "user friendly" software. In addition, there is the possibility that non-miniMEDLINE searchers may have become more motivated to search since they have had to actively pursue a number of steps to search the system they selected (e.g. obtain a password, set up a pc & modem, pay fees, learn commands, etc.)

Time of day when searching is done could not be correlated with the selection of a primary search system. Over two thirds of all individuals responding do their searches during the day, between 7:30 am and 5:00 pm (67.8%) while just less than one third search between 5:00 pm and midnight (31.3%). Only one individual reported searching between midnight and 7:30 am (0.3%).

An Unsolicited Defense for the Mediated Search Service...

Even though they weren't asked to, 36 of our faculty and 25 residents or 8% of the original group being surveyed sent back their questionnaires to tell us they had decided not to use a user friendly search system. With messages like "I have the librarians search. They're far more competent that I," we know that the demand for the mediated search service will not disappear. Others felt the need to remind us about the advantages of the library's SDI service. One faculty member seems to have it summed up nicely in his/her mind with the notation, "I ask -> You search."

...and the Role of Printed Tools

Could the library be getting carried away with automated search services, especially now that it is encouraging users to do their own searching? One questionnaire came back with a note telling us he/she had learned to use Index Medicus in medical school and that it met all his needs very well.

Conclusions

While the study results did not reveal a discrete set of user characteristics which affect system choice, a number of patterns regarding system selection and utilization emerged. Nine departments out of thirty (3%) account for 67% of all responses received. No statistically significant results could be determined regarding departmental affiliation and selection of a search system, other than miniMEDLINE is by far the most popular choice amongst all users, whether faculty member or resident in all departments. Five departments (Anesthesiology, Pharmacology, Psychology, Pathology, and Ophthalmology) each had one third of their respondents using a system other than miniMEDLINE as their primary search system. However no

commonality regarding the choice of a system for these users could be isolated.

Residents report doing searches primarily for patient care more than do their faculty colleagues. Faculty use of searches is heavily for research purposes. These findings must be appropriately taken into consideration as search systems are made available. Users should be encouraged to take their own needs into account as they make a decision regarding the search system they select as their primary information retrieval system.

There was an increased likelihood that individuals who categorized themselves as less experienced will choose miniMEDLINE over another system. It may also be hypothesized that inexperienced users are less hesitant to try low- or no-cost systems. This supports the availability of an easy-to-use "menu-driven" system, when the user population has limited experience with search systems.

No matter what system is being used, searchers' expectations regarding the number of citations retrieved have a significant relationship with their level of satisfaction. Therefore, we need to develop mechanisms to find out if searchers are getting the number of citations they expect and to provide alternatives if they are not. It is too easy for a library to be lulled into a sense of complacency in its training because it offers systems which are easy-to-use. For our library, this realization will be translated into educational sessions addressed to users whose expectations are not being met. Initial training must be augmented with (optional) additional sessions on search strategy, expanding or narrowing concepts, and the role of the MeSH vocabulary in the search process. This support must be offered to those who have been using the systems for a while. Marketing must target users who are not getting what they expected from the search system.

The number of respondents indicating that equipment is not easily available raises the question of those who are not doing searches at all. This survey rekindles in our minds the age old question of locating those who are not using the library and available search services and why. It is clear another study directed at those not using any search service must be conducted. While there may be a proliferation of personal computers, if residents cannot gain ready access, the library must develop strategies to facilitate access. However, if the number of remote users increases, the library will need to provide mechanisms to offer librarian assistance as data currently show librarians to be the single greatest resource for searchers.

Considering the varying needs, preferences, and financial resources of GWUMC faculty and residents, it is clear the library needs to continue its current multi-option approach to user friendly search systems. We believe this survey demonstrates the very real impact of cost and the use of search systems. Although miniMEDLINE is clearly the most popular system for our users, it is clear that miniMEDLINE alone would not be sufficient for all users. No specific patterns could be established by departmental affiliation. There can be no "efficiencies" by directing users from one department to one search system while users from another department are directed to another system. Future educational sessions will need to fully disclose all options, including the advantages and disadvantages of each. This supports the early decision of our library to avoid sponsorship of a single user friendly search system. The consulting approach employed in our introductory search seminar with its self-assessment instrument will need to be expanded and continued.

The results of this survey confirm our decision to make the investment in miniMEDLINE and then amplify it with the Silver Platter CD-ROM system. The good response to our survey indicates that faculty and residents at our institution are not devoid of information resources. The library providing search services free-of-charge eliminates the cost barrier. Libraries need to pay attention to the costs associated with searching so that fees do not become barriers to those who need information. Rachel Anderson in a recent article on information transfer pointed out that "in several years, computer-based literature will constitute a significant portion of our information resources." As we proceed in providing access to computerized databases and in replacing local resources with them, it is more important than ever that we "confront the issue of shifting the burden of cost from the institution to the individual user. There is, as many have pointed out, an inherent danger of the possible emergence of information 'haves' and 'have nots,' even within the same institution." 1

We feel the responses of our users are not unique to our institution and that other libraries, particularly those which offer an array of overlapping information retrieval systems, can profit from our analysis of the patterns of use at GWUMC and the conclusions drawn as they make decisions regarding the selection and support of search systems.

While the results of the study do not support specifically tailoring promotion and training efforts for various systems to specific departments, the study has revealed a number of areas

1. Anderson, Rachel K. The Health Sciences Library of the Future. Journal of the American College of Dentists 1989; 56(3): 45-49.

where the library can effectively improve its overall promotion and training programs for the selection and use of search systems. The survey response corroborates the decision to leave unaltered the number of systems for which the library provides support. However, new questions emerge. The library must next focus on the reasons why there are health providers who still aren't using information services at all.

Appendix 1

USER FRIENDLY SEARCH SYSTEMS WORKSHOP

NEEDS ASSESSMENT

1. Why do you want to search? (Check one.)

_____ a. To find quick answers to patient care questions.

_____ b. To locate in-depth information to support research needs.

_____ c. To locate information to support teaching endeavors.

_____ d. Other? Please describe below:

2. How often do you think you will search? (Check one.)

_____ a. Once a week or more often.

_____ b. Once every 2 weeks, once a month, or even more infrequently.

3. How much money are you willing to spend on an average search? (Check one.)

_____ a. $6.00 or less.

_____ b. Over $6.00.

4. In which databases are you most interested? (Check one.)

_____ a. Subset of MEDLINE which contains journals which are most widely available.

_____ b. MEDLINE only--MEDLINE is the major database for biomedical literature; particularly useful for patient care questions.

_____ c. MEDLINE plus other databases from the National Library of Medicine including CANCERLIT for cancer information; HEALTH for information on health care administration topics; TOXLIT & TOXLINE for toxicology/poisoning information.

_____ d. MEDLINE plus other NLM databases plus a wide variety of commercial databases including BIOSIS (Biological Abstracts), PSYCINFO (Psychological Abstracts), pharmacology or patents or business or AIDS databases, etc.

Appendix 2 Control Number _____

The purpose of this questionnaire is find out how faculty and residents select and use any of the four MEDLINE search systems (miniMEDLINE, BRS/Colleague, Paperchase, or Silver Platter CD-ROM MEDLINE) offered by or through the Himmelfarb Library.

1. Are you a member of the: (circle one)
   a. faculty
   b. housestaff

2. In which department is your primary appointment: (circle one)

a.Anatomy
b.Anesthesiology
c.Biochemistry
d.Cardiology
e.Computer Medicine
f.Dermatology
g.Emergency Medicine
h.Endocrinology
i.Gastroenterology
j.Health Care Sciences
k.Hematology/Oncology
l.Internal Medicine
m.Medicine
o.Microbiology
p.Neurological Surgery
*Other_____

p.Neurology
q.Obstetrics & Gynecology
r.Ophthalmology
s.Orthopaedic Surgery
t.Pathology
u.Pediatrics
v.Pharmacology
w.Physiology
x.Psychiatry
y.Radiology
z.Renal Diseases
aa.Rheumatology
ab.Surgery
ac.Urology

3 What year did you receive your degree? _____

4. Please indicate the primary areas in which you use MEDLINE search information, rank ordered so your most common use is #1, second most common use is #2, etc.
   ____Patient Care
   ____Education
   ____Research
   ____Other (specify)_____

5. How experienced a user of online databases do you consider yourself to be? (circle one)
   a. very experienced
   b. somewhat experienced
   c. not very experienced
   d. not at all experienced

6. Indicate the MEDLINE search systems you have used in the last six months. (circle all that apply)
   a. miniMEDLINE
   b. Paperchase
   c. BRS/Colleague
   d. Silver Platter CD-ROM MEDLINE
   e. Other_____

7. Indicate which search system is the search system you have used most often in the last six months when searching for information. (circle one)

a. miniMEDLINE
b. Paperchase
c. BRS/Colleague
d. Silver Platter CD-ROM MEDLINE
e. Other_____

All the following questions refer to the search system you identify in Question #7.

8. How significant an influence is cost on the system you use most often? (circle one)

a. Very significant
b. Some significance
c. Not significant

9. For the system you use most often, circle the statement below which best describes the influence of who pays the cost of searches on your usage. (circle one)

a. The Library offers the system free-of-charge.
b. My Department is paying for search costs.
c. I pay for searches, but I get a group discount.
d. Cost is not a significant factor in my use of the system.

10. Circle all statements which describe your reasons for using the search system you use most often: (circle all that apply)

a. I usually want to get only citations to journals available in the Himmelfarb Library.

b. I usually want to search the entire MEDLINE file.

c. I like to be able to order articles online myself.

d. I like to have access to the full text of articles online.

e. I sometimes want to search databases other than MEDLINE. If you circle e., specify the other databases you search:_____

f. The system I use most often has advanced search capabilities (e.g. the ability to explode MeSH terms).

11. For the system you use **most often**, circle the **two** statements which best describe why you use it more than others: (circle two)

a. I used the system before coming to GWUMC.

b. I use the system paid for by my department.

c. I use a system available for free from the Library.

d. I use a system that is easy to use and requires no training.

e. I use a system which meets my needs better than the others.

f. I use a system for which the library offers training.

g. I use a system which was recommended by a colleague.

h. I use a system which I saw demonstrated at a professional meeting.

12. I search from: (circle all that apply)

a. The Library
b. Office/Dept.
c. Home

13. I do most of my searching from: (circle only one)

a. Office/Dept.
b. Home
c. The Library

14. If you do most of your searching in the Library, is it because: (circle one)

a. You prefer to work in the library.

b. Computer equipment is not available in your office/dept. or home.

c. Librarians are available to assist you.

d. Compact disk equipment is only available in the Library.

15. How often have you searched in the last month (circle one)?

a. 0 - 3 times
b. 4 - 6 times
c. 7 - 10 times
d. more than 10 times

16. Does the number of searches you do effect your decision about which search system you regularly use? (circle one)

a. Very significantly
b. Some significance
c. Not significant.

17. I do most of my searching between the hours: (circle one)

a. 7:30am - 5:00pm
b. 5:00pm - midnight
c. midnight - 7:30am

18. How satisfied are you with the results of your searches?

Very satisfied Not satisfied

1 2 3 4 5

19. Do you typically retrieve: (circle one)

a. too few citations

b. about the right number of citations

c. too many citations

20. What is the <u>first</u> thing you do when you are not satisfied with search results?

a. Ask a colleague.

b. Use another search system. If so, which one_____

c. Ask a librarian for assistance.

d. Request that a search be done by a librarian.

e. Assume there is nothing else and take no further action.

4/survey.clr

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